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POUR L'ALIMENTATION ET L'AGRICULTURE

WORKSHOP TO DELIVER EPIDEMIOLOGY AND LABORATORY TRAINING FOR HPAI DIAGNOSTIC NETWORK TCP/RAS/3006-3007-3008

Mission Report
From June, 14th to June, 17th

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RESUME :
Suite à la menace croissante du virus H5N1 de la grippe aviaire qui a entraîné à ce jour l'élimination de plus de 140 millions de poulets en Asie, la FAO a mis en place une série de trois projets du Programme de Coopération Technique (TCP/RAS/3008, TCP/RAS/3007 et TCP/RAS/3006) en Asie du Sud, de l'Est et du Sud-est intitulés « Coordination des laboratoires de diagnostic et des réseaux de surveillance pour le contrôle et la prévention de la grippe aviaire ». Ces projets ont une approche multidisciplinaire, au niveau national et régional et ont pour but d'améliorer la surveillance et le suivi épidémiologique de la maladie. Cet atelier de formation a été réalisé à la demande de la FAO. Il répond au besoin de renforcer les connaissances de base en épidémiologie et en épidémiosurveillance des pays qui bénéficient de ces PCT, et de favoriser une bonne collaboration régionale en établissant des contacts entre les différents centres épidémiologiques et les laboratoires de diagnostic des différents pays. La formation a réunit 18 participants, occupants des postes à responsabilités dans les services Vétérinaires ou dans les laboratoires de diagnostic, originaires de 10 pays (Cambodge, Timor Est, Indonésie, Laos PDR, Malaisie, Myanmar, Papouasie Nouvelle Guinée, Philippines, Thaïlande et Vietnam). Il a été constaté une motivation importante des participants et une participation active favorisant les échanges d'expériences entre des pays dont les réseaux de surveillance sont à des niveaux d'efficacité différents. Une version légèrement modifiée de cette formation, suite aux recommandations notées dans ce rapport, sera reconduite à Beijing en septembre 2005 pour 12 autres pays (Afghanistan, Bangladesh, Bhutan, République de Chine, Inde, République Démocratique de Corée; République de Corée, Maldives, Mongolie, Népal, Pakistan, Sri lanka). Les conclusions de ces deux ateliers serviront à mettre en évidence les points faibles des différents systèmes de surveillance et à élaborer des plans de formations spécifiques répondant aux besoins de chaque pays.

ACRONYMS

CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
DL	Distance Learning
ENVA	Ecole Nationale Vétérinaire d'Alfort
FAO	Food and Agriculture Organization of the United Nations
FAORAP	FAO Regional Office for Asia and the Pacific
GIS	Geographic Information System
HPAI	Highly Pathogenic Avian Influenza
MCQ	Multiple Choice Questionnaire
OIE	Office International des Epizooties
RANEMA	Remise A Niveau en Epidémiologie des Maladies Animales
RVC	Royal Veterinary College
SEAFMD	Southeast Asia Foot and Mouth Disease
TCP	Technical Cooperation Programme

SUMMARY

In respond to the increasing threat of the H5N1 avian influenza which to date has lead to the slaughter of more than 140 million chickens in Asia, the FAO implemented a set of three projects under the Technical Cooperation Programme (TCP/RAS/3008, TCP/RAS/3007 and TCP/RAS/3006) in South, in East and in South-east Asia , entitled "Diagnostic Laboratory and Surveillance Network Coordination for Control and Prevention of Avian Influenza". These projects have a multidisciplinary approach, at national and regional level and have the main goal of improving the epidemiological surveillance and the monitoring of the disease. This workshop was carried out at the request of and in collaboration with the FAO, in order to reinforce basic knowledge in epidemiology and in epidemiosurveillance of the countries who profit from these TCP, and to establish contacts between the different epidemiologic centres and the laboratories of the various countries to enhance regional collaboration. The training brought together 18 participants, who are holding position of responsibility in the Veterinary Services or in the laboratory, and who were originally from 10 countries (Cambodia, East Timor, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and Vietnam). We could observe an important motivation of the participants and a very good participation in all activities. These group dynamics enhanced experience sharing between countries with sometimes very different levels of effectiveness in their surveillance network. A modified version of this training, further to the recommendations noted in this report, will be renewed in Beijing in September 2005 for 12 other countries (Afghanistan, Bangladesh, Bhutan, Republic of China, India, Democratic Republic of Korea; Republic of Korea, Maldives, Mongolia, Nepal, Pakistan, Sri Lanka). Conclusions of these two workshops will be used to highlight weak points of the various surveillance systems and to work out specific training plans to meet the needs of each country.

TABLE OF CONTENTS

1. Background

The Food and Agriculture Organisation of the United Nations (FAO) is implementing in three sub-regions (Southeast Asia, East Asia and South Asia) three projects which are respectively TCP/RAS/3006, TCP/RAS/3007 and TCP/RAS/3008, entitled "Diagnostic Laboratory and Surveillance Network Coordination for Control and Prevention of Avian Influenza" in order to improve the quality and transparency of the information, and so to ensure early detection of and response to Highly Pathogenic Avian Influenza (HPAI). With the establishment of collaborating networks for diagnostic laboratories and for centres of veterinary epidemiology, the aims of the projects are to enhance the international and regional cooperation and to establish sustainable regional networks on HPAI.

During meetings between the FAO and the different representatives of the sub-regions, needs of training in epidemiological analysis at both the introductory and advanced levels have been identified as a prerequisite to effective functioning of the epidemiology networks.

As members of the FAO Epidemiology Consortium, the Royal Veterinary College (RVC, UK), EPICENTRE (New Zeeland), AFFA (Government of Australia), CEAH (Government of USA) and the CIRAD-Emvt (France) were solicited by the FAO to conduct various training workshops in Bangkok and Beijing.

The institutions agreed on the dispatching of the activities to be carried out during the workshop: basic epidemiology by CIRAD, advanced epidemiology by RVC and a epidemiology data management by EPICENTRE. AFFA and CEAH will develop specific trainings for countries at risk but not affected. Responsibility for the development of a training plan corresponding to each necessary level was distributed between the organisations taking part in the workshops according to their recognized fields of competences. The distribution was defined as follows for the two first sets of trainings

Trainings undertaken by the Cirad-Emvt – Introductory level:

- Basic knowledge in epidemiological surveillance (organisation, protocol surveillance, case definition, evaluation...)
- Knowledge in descriptive epidemiology approach (definitions, calculation of the main measures of disease frequency...)
- Description and adaptation of the FAO and OIE recommendations related to the surveillance of HPAI virus
- Introduction to the use of participatory epidemiology
- Basics principals of diagnostic tests and sampling rules

Trainings undertaken by the RVC – Advanced level:

- Diagnostic test evaluation
- Data management for disease surveillance
- Sampling for disease surveillance
- Introduction to GIS
- Exploration and visualisation of spatial data
- Lectures and practical including data analysis

(see the provisional planning in Annex 1)

This report concerns the training for introductory level held in Bangkok between the 13th and the 17th of June 2005.

2. Program and pedagogic approach

At the beginning of the workshop the outputs were defined as follow:

- Enhanced skills and capability in epidemiological analysis on the part of workshop participants;
- Contribution to the construction of sustainable sub-regional epidemiological networks for HPAI and other transboundary animal diseases build on the Southeast Asia Foot and Mouth Disease (SEAFMD) model;
- Training materials.

The training program was drafted by the Cirad-Emvt and validated by the FAO (see Annex 2). The first day was dedicated to adjustment of the content and practical details of the workshop with FAO Regional Office and preparation of the content with participants. For each session, pedagogic objectives were identified in order to comply with the outcomes expected by the FAO (see Annex 3).

A large room was given to participatory techniques in order to promote experience sharing between participants and to enhance the effective collaboration between epidemiology institutes in neighbouring countries.

To increase the impact of the training, a distance-learning programme "RANEMA" (refresher course in animal disease epidemiology) was used as a supplement. This tutorial was created jointly by the National Veterinary School of Alfort (ENVA) and the Cirad-Emvt and it's based on the book[1] "Applied Veterinary Epidemiology and the control of disease in population", which was provided to each participant. This training was a new interactive and recreational way to acquire bases in epidemiology.

3. The course of training

Participants: This workshop got together 18 participants coming from 10 different countries (Cambodia, East Timor, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and Vietnam). The full list of participants is attached to this report (Annex 4). The strong motivation of all the participants should be stressed as well as their active involvement in all proposed participatory work.

Place of training and logistical organisation: The workshop took place within the Chulalongkorn University. The facilities were perfectly adapted to the contents of the workshop. Because of the strong and effective implication of the teachers of the University in charge of the logistic organization, the training has been held under the best conditions. We are grateful for it because this contribution was determining in the success of this workshop.

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[1] Toma,B., Dufour,B., Sanaa,M., Benet,J.-J., Ellis,P., Moutou,F. and Louza,A. 1999: *Applied veterinary epidemiology and the control of disease in populations*. Maisons-Alfort, France: AEEMA, 536pp

Working group activities: The lectures have been filled up with two working group activities during which participants have been led to think about:

- the importance of a prompt dissemination and feedback of the results in a surveillance network (both at national and regional level);
- the way to implement the principal recommendations of the FAO and OIE for the surveillance of HPAI in different socio-economic contexts.

Oral presentations by participants were carried out after the work organised in 3 groups. The methodology and the review of both activities have been summarised and are presented in the annex 5.

Computer activities in half attendance: For the introduction of basic concepts in epidemiology and diagnostic test evaluation, sessions in the computer room were organised. Participants were working in pairs, they were asked to achieve different kind of activities and exercises, using a tutorial for distance-learning (RANEMA) and software for epidemiologists (EpiInfo, WinEpiscope). Trainers were there to guide each trainees' couple on how to find the solution and to give more explanation where it was necessary. Exercises and software are presented on the CD-ROM.

Acquired knowledge: This evaluation measured, at the end of the training, the knowledge acquired by the participants and gave information on the participants' perception of a problem or a given concept.

A multiple choice questionnaire (MCQ) was used at the start of the session to have a baseline of the participants' initial knowledge and perceptions, and then at the end of the training to measure the degree of improvement. Questions were asked in ascending order of difficulty.

The objective of the evaluation was to measure:

- the basic overall skill of the group
- to detect potential disparities in order to adapt the content of the course
- the overall progress of the entire group

Thus, it was individual and anonymous.

The mean of the MCQ are significantly different ($p<0.01$ using a paired t-test) between the two evaluations, with the mean of the final evaluation (12.2/20) being, in average, **4 points greater** than the initial evaluation (8.2/20).

The mean progression is maybe the result of a **better understanding** after the training by the participants of:

- the definition (+54% of correct answers) and objective of a surveillance system (+ 45% of correct answers)
- the main characteristics of participatory epidemiology (+25%)
- the definition of a gold standard (+25%)
- the method to obtain an accurate sample (+25%)

The questions **best answered** during the final evaluation are:

- The definition of epidemiosurveillance (85%)
- The definition of the sensitivity of a diagnostic test (85%)
- The definition of the denominator data (80%)
- The purpose of standardisation (75%)

The questions **less understood** during the final evaluation are:

- Diseases are not randomly distributed in epidemiology (30%)
- The definition of the sensitivity of a case-definition (40%)
- That epidemiosurveillance is a component of descriptive epidemiology (40%)
- The meaning of the confidence interval for the mean (47.5%).

More details are available in the annex 6.

Evaluation of satisfaction: The last day of the workshop, each participant was brought to make his/her remarks about the training proposed and to quantify his/her degree of satisfaction about the contents and the method used. The assessment is on the whole positive (details in the annex 7). The total satisfaction rate is 86.6 % (87.5% for the contents and 85.7% for the methods). The sessions in the computer room, RANEMA and the Data Analysis, were the most appreciate by the participants. But, data analysis exercises were as well what was found the most difficult to understand (mentioned 6 times). Fifty percent of the participants suggested that the course should have been scheduled on a longer period in order to decrease the number of training hours per day.

Teaching material: To avoid overloading participants with papers, the set of teaching materials used by the trainers was compile in a CD-ROM given to every participants and joint in the present report. (Annex 8: organisation chart of the CD-ROM). The book "Applied veterinary epidemiology and the control of disease in population" was as well provided to each participant.

4. Conclusion and recommendations:

This training session had for main objectives to refresh the participants mind on basic epidemiology concepts and to make them understand in a better way what is epidemiosurveillance and what are the key points and the constraints to focus when implementing a sustainable surveillance network. Since, some participants were from a laboratory background, this training was for them an initial introduction to epidemiology. This workshop should have contributed to (is the first step toward) the establishment of a sustainable regional network on avian influenza. As suggested by FAO, the SEAFMD model could be used to strengthen regional co-operation and enhance the national efforts to control and to eradicate the disease.

During the workshop a true dynamic of experiences sharing is born between the participants who showed a great interest and an important involvement in every activity proposed. This dynamic could be maintained through the organisation of regular workshops between member countries- and if possible joining together the same participants - where specific points could be tackled (assessment of each surveillance system, weak points and success of the surveillance...).

In the aim of harmonising the surveillance methods of HPAI virus in the sub-regions, it is of importance that FAO could regularly provide updated information to assist the countries in the design and implementation of appropriate surveillance protocols. A particular attention should be given to the definition of harmonised case-definitions for countries with comparable production systems and capacity. Indeed, it was noted that those definitions, particularly important for the sensitivity and specificity of the surveillance network, largely vary between countries and were often a weak point of their system.

The training also brought out specific weaknesses or difficulties faced by each country in their surveillance system. Training needs to improve the skills and the capabilities of their field or laboratory staff in epidemiology and surveillance were clearly expressed:

- Data analysis: basics statistics in order to interpret the results of study/surveillance, use of common software, how to present the results of study or surveillance network in a report or a conference, etc;
- Participatory epidemiology;
- Training needs in surveillance.

Data analysis is also covered by the advanced course given by the RVC. Training of trainers and definition of pedagogic objectives for education of the actors of a surveillance network need more time and should be organised during a next session.

To meet these needs, specific attention should be given to distance learning since it is difficult to remove staff from their duty in a general context of lack of human resources within the national veterinary services. Furthermore, participants from some countries need to strengthen their basis in epidemiology/statistic/computer before to really benefit from a short term intensive course, which could be better done by distance learning courses. The use of RANEMA during the workshop was a great success and could be easily extended and improved.

Session could be organised in the different countries:

- directly on internet with the supervision of tutors connected online;
- or during training session supervised by tutors specifically trained to direct the trainees.

This system could also allow staff with limited English understanding to progress to their own rhythm. The contents of RANEMA can be easily adjusted to the specific needs and level of the participants.

In order to respond to the shortcomings which came up during this first training session and to meet trainees' expectations, the programme of the next workshop in Beijing should be slightly modified. More emphasis should be placed in the basic principles of epidemiology during the first two days and more time should be given for the data analysis part with short exercises to enable the trainees to take the software in hand. Lectures should be shorter and with more practical.

It is recommended to repeat next year, if possible with the same participants, similar workshops in order to continue to reinforce skills and capacities in the field of HPAI surveillance.

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We warmly thank Dr Wantanee Kalpravidh (FAORAP) for the excellent working conditions as well as the staff of the University for their help and fruitful collaboration. We also thank Dr. Ronello Abila, Coordinator of the SEAFMD campaign, for his presentation of the FMD network in Southeast Asia.

Annex 1

RVC WORKSHOP PROGRAMME

	Monday 27June	Tuesday 28 June	Wednesday 29 June	Thursday 30 June	Friday 1 July
8:30 - 9:30	Preparation of the Workshop with the FAO staff	Diagnostic test interpretation	Discussion of results from computer exercises	Discussion of results from computer exercises	Discussion of results from computer exercises
9:30 - 10:30			Sampling for disease surveillance	Introduction to GIS	Exploration of spatial data
10:30 - 11:00		Coffee break	Coffee break	Coffee break	Coffee break
11:00 - 12:30		Exercise - Diagnostic test interpretaton	Exercise - Sampling for disease surveillance	Exercise - Introduction to GIS	Exercise - Exploration of spatial data
12:30 - 14:00		Lunch	Lunch	Lunch	Lunch
14:00 - 15:30		Data management for disease surveillance	Analysis of surveillance data (Part 1)	Visualisation of spatial data	Integrating databases and epidemiological reporting and analysis
15:30 - 16:00		Coffee break	Coffee break	Coffee break	
16:00 - 17:00		Exercise - Data management for disease surveillance	Exercise - Analysis of surveillance data	Exercise - Visualisation of spatial data	General discussion. Workshop appraisal (Questionnaire)

Annex 2

CIRAD WORKSHOP PROGRAMME

Time schedule	Activity	Method	Trainer
D1 (13/06)			
16h00 -18h00	Workshop preparation		
	Opening	Official opening FAO	
	Presentations	Participants, objectives, time schedule	
	MCQ	Individual and anonymous questionnaire	

Time schedule	Activity	Method	Trainer
D2 (14/06)			
8h00 – 9h30	Epidemiology epidemiosurveillance: an introduction	Lecture	FR
9h30 – 10h30	RANEMA: Introduction	Computer activities	FG
10h30 – 11h00	*Coffee break*		
11h00 – 12h30	Epidemiosurveillance – protocols: case definitions and standardisation	Lecture	SD
12h30 – 14h00	*Lunch*		
14h00 – 15h30	Epidemiosurveillance – protocols: information feedback	▪ Lecture ▪ Brainstorming on an article of the revue Nature "Global task force for Influenza" ▪ Group-work: 3 subgroups with different disease situation have to answer several questions about the importance of communication (annex 4) ▪ Restitution of work	FR
15h30 – 16h00	*Coffee break*		
16h00 – 17h00	Epidemiosurveillance – networking: evaluation	Lecture	FG
17h00 – 18h00	RANEMA	Computer activities	

Time schedule	Activity	Method	Trainer
D3 (15/06)			
8h00 – 9h30	RANEMA	Computer activities	
9h30 – 10h30	FAO / OIE guidelines HPAI surveillance: global presentation	Lecture	FR
10h30 – 11h00	*Coffee break*		
11h00 – 12h30	HPAI surveillance in Cambodia: results, lessons, perspectives	Lecture	SD
12h30 – 14h00	*Lunch*		
14h00 – 15h30	FAO / OIE guidelines HPAI surveillance : cases-study	▪ Group-work: 3 subgroups with different system of poultry productions have to answer several questions about the implementation of the surveillance guidelines (annex 5)	FR SD FG
15h30 – 16h00	*Coffee break*		
16h00 – 17h00	FAO / OIE guidelines HPAI surveillance : cases-study	▪ Restitution of work	FR SD FG
17h00 – 18h00	RANEMA	Computer activities	

Time schedule	Activity	Method	Trainer
D4 (16/06)			
8h00 – 9h30	RANEMA	Computer activities	
9h30 – 10h30	Introduction to participative approaches in epidemiology	▪ Brainstorming: Participants write down two ideas coming into their mind concerning "Participatory methods". They have only around 2-5 minutes to write their associations. Answers are collected and classified on a blackboard. After the presentation, the answers are discussed. ▪ Lecture	FG
10h30 – 11h00	*Coffee break*		
11h00 – 12h30	SEAFMD	Lecture	RA
12h30 – 14h00	*Lunch*		
14h00 – 15h30	FAO / OIE guidelines HPAI surveillance : conclusion	▪ Restitution of work ▪ Lecture on training needs assessment	FR SD FG
15h30 – 16h00	*Coffee break*		
16h00 – 17h00	Presentation of field data from Cambodia	Lecture	SD
17h00 – 18h00	Introduction to WinEpiscope	Computer activities	

Time schedule	Activity	Method	Trainer
D5 (17/06)			
8h00 – 9h30	Tests evaluation: an introduction	Lecture	FR
9h30 – 10h30	Excel / WinEpiscope / EpiInfo	Computer activities	FR SD FG
10h30 – 11h00	*Coffee break*		
11h00 – 12h30	Basic sampling methods	▪ Warm-up: The aim is to determine the average age of all participants in the room, and this will be done in 4 different ways. By doing a census, by drawing a small size sample, a large size sample and by doing a convenient sampling. Results observed are compared and discussed. ▪ Lecture	FG
12h30 – 14h00	*Lunch*		
14h00 – 15h30	Excel / WinEpiscope / EpiInfo	Computer activities	FR SD FG
15h30 – 16h00	*Coffee break*		
16h00 – 18h00	MCQ / evaluation	Individual and anonymous questionnaire	
	Closing		

RA : Ronelo Albila
SD: Stéphanie Desvaux
FG: Flavie Goutard
FR: François Roger

Annex 3

PEDAGOGIC OBJECTIVES

Session 1:

At the end of this session, participants should be able to:

- Describe the role and the stakes of epidemiological surveillance at a national and supranational level;
- Describe the organizational principals and the implementation of activities in an epidemiological surveillance network.

Sessions 2 and 3:

At the end of this session, participants should be able to:

- Explain the point of establishing a surveillance protocol;
- Describe the stages of elaborating a surveillance protocol;
- Describe the procedures to be used so that data collected is standardized;
- Explain the importance of communicating the results of surveillance activities to network actors and regional and international partners.

Session 4:

At the end of this session, participants should be able to:

- Explain the purpose of an evaluation system in steering an epidemiological surveillance system;
- Describe several indicators that may be used in the evaluation of an epidemiological surveillance system.

Sessions 5, 6, 7, and 8:

At the end of this session, participants should be able to:

- Describe the principal recommendations of the FAO and the OIE for the national and supranational surveillance of avian influenza;
- Describe how these recommendations may be adapted to an individual country;
- Apply these recommendations to different production systems.

Session 9:

At the end of this session, participants should be able to:

- Describe the principals of participatory approaches in epidemiology and the advantages of integrating them into an epidemiological surveillance network.

Sessions 10 and 11:

At the end of this session, participants should be able to:

- Describe the limits and constraints of a regional surveillance network;
- Identify the critical points to be mastered for a regional approach to the surveillance of avian influenza and the ensuing training needs.

Sessions 12 to 14:

At the end of this session, participants should be able to:

- Apply the basic principals and evaluation modes of a diagnostic test;
- Apply the basic principals of sampling rules.

RANEMA, basic concepts in epidemiology:

At the end of the training, in the field of applied veterinary epidemiology and the control of disease in populations, the participants should be able to:

1. To give the definition of the **main words** used in epidemiology: epidemiology; descriptive epidemiology / analytical epidemiology; epidemic (epizootic) / endemic (enzootic) / pandemic (panzootic) / common source epidemic; incidence / prevalence; morbidity rate / mortality rate / case fatality rate; disease / infection, reservoir, vector.

2. To explain the **difference** between the **descriptive** epidemiology approach and the **analytical** epidemiology approach.

3. To implement the **descriptive epidemiology approach** for any disease in a population: to process and analyse the main measures of disease frequency (incidence, prevalence and the different rates) by using the appropriate unit of epidemiological interest (the individual or the herd) and by quantifying disease occurrence in a population, in ti.

4. To give the definition of the **words**: screening test, diagnostic test, sensibility and specificity of a test, predictive values (negative or positive) of a result, apparent prevalence, and true prevalence.

5. To calculate the sensitivity, specificity and predictive values of a **screening test** applied at individual level and to distinguish the quality of a test and the quality of the results.

6. To prepare a simple **sampling design** in order to estimate a prevalence or a rate (**quantitative** approach) to describe a disease in a region and/or during an outbreak (animal health, public health):

    a. To define a representative sample
    b. To make the difference between accuracy and precision
    c. To define the factors influencing the accuracy and the precision of the result estimated from a sample
    d. To calculate the confidence interval of the population prevalence

Annex 4

LIST OF PARTICIPANTS

N°	Name	Country	e-mail	Address
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Annex 5

WORKING GROUP ACTIVITY

1- Dissemination of information

Group 1:
In charge of the surveillance in an infected country
During the peak of an HPAI epizootic

Group 2:
In charge of the surveillance in a HPAI free country
HPAI is notified in neighbouring country

Group 3:
In charge of the HPAI surveillance in a country applying vaccination programme

1. **What kind of information has to be displayed?**

2. **Which dissemination of the information?**
   - **To whom?**
   - **Where?**
   - **When?**
   - **How?**

A.Restitution of the work, in red are the constraints :

GROUP 1: Infected country During peak of HPAI epizootic

	To whom	Type of Info	When	How
National level	General public: Poultry sector Government official Media	"Short message": - number of outbreaks - places - prevention measures Different pieces of information targeting at difference audience (technical staff)	ASA for cases confirmed by the lab Causing some delays	TV / Radio Leaflets Newspapers Website Funding Often cause unnecessary panic
Regional level	Neighboring countries ASEAN	As above Reports	When ever there is a new outbreak detected	E-mailing Website
International level	OIE WHO (through country representative) FAO Importing country donor	As specified in the OIE format	As above	E-mailing Website

CAHW: lack of diagnostic skills

GROUP 2: HPAI free country HPAI notified in neighboring country

	To whom	Type of Info	When	How
National level	Stakeholder Vet Paravet Quarantine station Public Health Official Government official Policy makers Laboratory staff People	Information about the disease: - definition - prevention, control - plan Reporting from neighboring countries Standard diagnostic – active surveillance Education (public awareness)	Immediately after reported from neighboring country Routine report (weekly, monthly…)	Meeting, conference, workshop, newsletter, email
Regional level	Laboratory network Neighboring country authorities Importing/exporting country	Disease situation in our country from infected country – active surveillance Plan about: - stop import from infected country (letter…) - make confidence for control / preventive	weekly	Official letter
International level	OIE, WHO, FAO	Disease situation Policy about strategic plan	Weekly monthly	Official letter Email Website

CONSTRAINTS:
Budget (financial)
communication problems
decision makers
transport
manpower
technologies and knowledge

Group 3: in charge of HPAI surveillance in a country applying a vaccination programme

Level	To whom	Type of information	When	How
National	Farmers	Lab results about serological titres	After each sampling	Notification letter
	Field veterinarians	Morbidity/mortality Report of the surveillance in the province	After complete information	Feed back official channel
	Veterinary Department officers	Summary of the surveillance	After complete surveillance	Official report
Constraints: poor communication system (such as e-mail) ; insufficient budget for sending reports, lack of well trained staff on data analysis				
International level	OIE, FAO, WHO, Regional countries	Complete report of vaccination efficiency	After complete surveillance	E-mail Website Official report Animal disease outbreak report (reporting form of OIE)

VACCINATION: Ab titers
Decrease of incidence
Sentinel birds

B. *Comments and discussion after the presentation*

GROUP 1: Infected country During peak of HPAI epizootic

	To whom	Type of Info	When	How
National level	General public: ***Poultry sector ?*** Government official **(Min. of Health ?)** **Media**	"Short message": - number of outbreaks - places - prevention measures Different pieces of information **targeting at difference audience (technical staff)**	ASA for cases confirmed by the lab Causing some delays CAHW: lack of diagnostic skills	TV / Radio Leaflets Newspapers Website Funding Often cause unnecessary panic
Regional level	- Neighboring countries - ASEAN: **which office?**	As above Reports	Whenever there is a new outbreak detected	E-mailing Website
International level	OIE WHO *(through country representative)* FAO Importing country **donors...**	As specified in the OIE format	As above	E-mailing Website

GROUP 2: HPAI free country HPAI notified in neighboring country

Type of info vs. the different stakeholders?

	...hom	Type of Info	When	How
National level	St... holder (?) Vet (...rivate? Field?) Paravet Quarantine station Public Health Official Government official Policy makers Laboratory staff People	Information about the disease: - definition - prevention, control - plan Reporting from neighboring countries Standard diagnostic - active surveillance Education (public awareness) Suspected cases?	Immediately after reported from neighboring country Routine report (weekly, monthly...)	Meeting, conference, workshop, newsletter, email **Constraints ?**
Regional level	Laboratory network Neighboring country authorities Importing/exporting country	Disease situation in our country from infected country - active surveillance Plan about: - stop import from infected country (letter...) - make confidence for control / preventive	weekly	Official letter ? Regional web site?
International level	OIE, WHO (?), FAO	Disease situation Policy about strategic plan	Weekly monthly	Official letter Email Website

CONSTRAINTS:
Budget (financial)
Communication problems
Decision makers ?
Transport
Manpower ?
Technologies and knowledge

Group 3: in charge of HPAI surveillance in a country applying a vaccination programme

Level	To whom	Type of information	When	How
National	Farmers	Lab results about serological titres	After each sampling	Notification letter
	Field veterinarians	Morbidity/mortality Report of the surveillance in the province	After complete information	Feed back official channel
	Veterinary Department officers Min of Health ?	Summary of the surveillance	After complete surveillance	Official report
Constraints: poor communication system (such as e-mail) ; insufficient budget for sending reports, *lack of well trained staff on data analysis*				
International level	OIE, FAO, WHO (?) Regional countries	Complete report of vaccination efficiency	After complete surveillance	E-mail Website Official report Animal disease outbreak report (reporting form of OIE)

VACCINATION: Ab titers
Decrease of incidence
Sentinel birds

TRAINING ?

REMARKS :

All the groups understood the purpose of information feedback within a surveillance network.

In only one group, the Ministry of Health was not identified as a key stakeholder to whom data from the network should be transmitted directly.

The lack of well trained staff for data analysis was recognized by the participants.

2- Surveillance of HPAI in Diverse Countries

CHARACTERISTICS OF FOUR DIFFERENT POULTRY PRODUCTION SYSTEMS

Characteristics	**Poultry Production Systems**				
Parameter	**Industrial and Integrated Production**	**Commercial poultry production**		**Village or backyard Production**	
		Large Scale	**Small-Scale**	**Poultry**	**Domestic ducks**
Biosecurity	**High**	**High**	**Low**	**Low**	**Low**
Production System	**System 1**	**System 2**	**System 3**	**System 4**	**System 5**
Biosecurity	High	Medium	Low	Low	Low
Market outputs	Export and urban	Urban/rural	Live urban/rural	Rural	Rural/Urban
Location	Near capital and major cities	Near capital and major cities	Smaller towns and rural areas	Outdoors	Outdoors
Type of confinement	Indoors	Indoors	Indoors/Part-time outdoors	Not confined	Not confined
Housing	Closed	Closed	Closed/Open	Minimal	None
Contact with other poultry	None	None	Yes		
Contact with domestic ducks	None	None	Yes	Yes	Yes
Contact with other domestic birds	None	None	Yes	Yes	Yes
Contact with wildlife	None	None	Yes	Yes	Yes

Group 1:
Infected country practising vaccination with a predominant commercial sector
(*# birds in million*)

	Broilers	Layers and breeders	Backyard chicken	Duck	Goose	Other (pigeon, quail, chukar etc)
System 1						
Birds	30	25		5	0.5	
Farms	1,000	2000		500	100	
% vaccinated	50%	95%		50%	50%	
System 2						
Birds	40	20		5	2	
Farms	2800	2000		1000	300	
% vaccinated	66%	90%		50%		
System 3						
Birds	40	5		30	5	
Farms	10,000	5000		7500	600	
%vaccinated	?					
Systems 4 and 5						
Birds		-	40	10	2	
Farms/units			1.5*	*	*	
% vaccinated			?			
Total Birds	**110**	**50**	**40**	**50**	**9.5**	**10**

* Total number of village households with mixed poultry species.

Group 2:
Infected country not practicing vaccination with predominant village poultry sector
(*# birds in million*)

	Broilers	Layers and breeders	Backyard chicken	Duck	Goose	Other (pigeon, quail, chukar etc)
System 1						
Birds						
Farms						
System 2						
Birds	60 000	50 000				
Farms	6	5				
System 3						
Birds	1.5	2		1		
Farms	1500	2500		2000		
Systems 4 and 5						
Birds		-	18	1	200 000	
Farms/units			2*	*	*	
Total Birds	1.56	2.05	18	2	200 000	

* Total number of village households with mixed poultry species.

Group 3:
Country free of disease but at-risk for HPAI
(*# birds in million*)

	Broilers	Layers and breeders	Backyard chicken	Duck	Goose	Others
System 1						
Birds						
Farms						
System 2						
Birds	50	15				
Farms	3000	1200				
System 3						
Birds	40	7		30		
Farms	10000	3000		7500		
Systems 4 and 5						
Birds			?	?	?	?
Farms/units			3 millions			
Total Birds	**90**	**22**	**?**	**?**		

Based on:

- Your knowledge and experiences
- Preliminary lectures from Day 1 of this workshop
- Presentation of FAO and OIE guidelines and documents

Each group have to work on these following topics:

1. **Protocols**

   - **What is (are) the case-definition?**
   - **Which type(s) of surveillance is (are) needed?**

2. **Networking**

   - **Which actors/stakeholders have to be implied in the surveillance network?**
   - **What are the position and role of the farmers within the surveillance system(s)?**

3. **Training**

   - **Which actors need to be trained in the field of surveillance?**
   - **For each type of actors, which skills need to be strengthened?**

90 minutes
Presentation per group in the afternoon
General discussion on D3

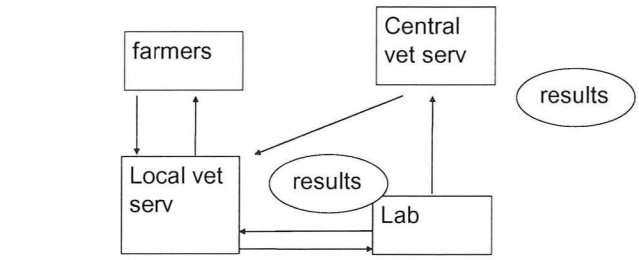
A.Restitution of the work, in red are the constraints :

Group 1

	Sector 1	Sector 2	Sector 3	Sector 4 / 5
Case definition	Unvaccinated farms: - sudden death - 30-40% for 3 days Vaccinated farms: - sentinel birds die	Similar to sector 1	Sudden death + clinical sign such as respiratory signs, diarrhoea	Sudden death
Type of surveillance	Vaccinated farms Passive Active: - serological - clinical surv on sentinel birds Unvaccinated farms - clinical surv Random sampling on all the farms		Passive Active: -clinical surv (except for ducks) -virological surv	Passive Clinical surveillance on sentinel villages by Villages Animal Health workers, every 3 months

Group 1

Networking



For sector 4: add VAHW

Group 1: Training

Farmers	VAHW	Field veterinarians	Central level	Laboratory staff
Disease information Biosecurity Sanitation Prevention Need to be adapted to the sector	Report about morbidity/ mortality and clinical signs	Collection of samples Report Disease recognition	Data analysis Report Information system	Diagnosis Upgrade technique

Group 2

Case definition:

System II & III

3% mortality rate and 2 fold increasing trend in the next 3 days

System IV & V

Unexplained mortality in 2 houses

Scanned surveillance

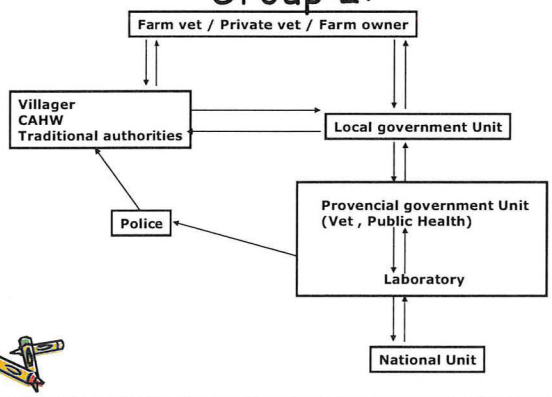
Targeted surveillance: In high risk area

-Previous outbreak area

-Waterfowl birds

-High density area

Group 2:



Group 2

Farmers / VAHW	How to recognise AI
	When to report and to whom
	Train to deal with AI
	Personnal Protective Equipment
	In some case how to collect samples
Farm vet / Private vet	Training on biosecurity - measure
	How to collect sample & to transport them
	How to use PPE properly
Local Unit (Technical)	How to implement the stamping out
	What information to collect
	How to implement survey
Provincial Unit	How to process information
Laboratory	Rapid diagnosis
	Standardisation of methods and reporting
National Unit	How to conduct accurate census
	How to organise survey

Group 3

- **What is (are) the case-definition?**
- Suspected case: respiratory signs with 3% mortality per day
- Confirmed: serological first (ELISA) followed by virological (IFAT, PCR, isolation)

Group 3:

Which type(s) of surveillance is (are) needed?

	Clinical	Virological	Serological
Scanned	Farms, Villages / Broilers	Market: cloacal swab in market. All species Slaughterhouse	Random from village
Targeted	Border area	Wild birds Duck/ Waterfowl	Quarantine station

Group 3: Networking

Which actors/stakeholders have to be implied in the surveillance network? What are the position and role of the farmers within the surveillance system(s)?

Actors/Stakeholders	Role
Farmer	Immediately report, helping to collect the samples
Vet	Education, clinical observation, organise sampling
Paravet	Assist vets in all activities
Lab (Diag)	Virus isolation and serological tests
Department of vet services	Collect, analysis, report data AI report to other countries Set up emergency responses Set up good animal husbandry practices
Policy makers	Think of compensation Funding Take action for importing exporting countries

Group 3: Training

Which actors need to be trained in the field of surveillance? For each type of actors, which skills need to be strengthened?

Actors/Stakeholders	Skills needed?
Farmers	GAHP, Biosecurity , Basic clinical sign
Vets	GAHP, Biosecurity , Basic clinical sign Update knowledge & situation on AI Network building for protection and control
Paravets	GAHP, Biosecurity , Basic clinical sign How to collect the sample
Lab (Diag)	Technique & standard all method for diagnosis
Department of vet services	Update knowledge & situation on AI Analysis Data method Process evaluation
Policy makers	

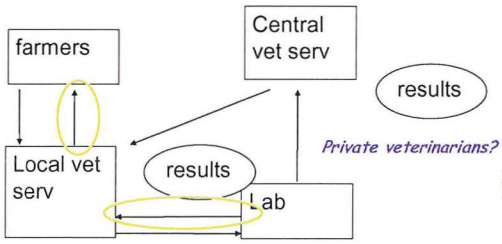
B. Comments and discussion after the presentation

Group 1

	Sector 1	Sector 2	Sector 3	Sector 4/5
Case-definition	Unvaccinated farms: - sudden death - **30-40% for 3 days ?** Vaccinated farms: - sentinel birds die	Similar to sector 1	Sudden death + clinical sign such as respiratory signs, diarrhoea *Idea of contagiosity??*	Sudden death *Idea of contagiosity??*
Type of surveillance	Vaccinated farms Passive Active: - serological - clinical surv on sentinel birds Unvaccinated farms - clinical surv Random sampling on all the farms		Passive Active: -clinical surv (except for ducks) -virological surv *Frequency?* *Type of sampling?*	Passive Clinical surv on **sentinel** villages by Villages Animal Health workers, every 3 months

Group 1

Networking



For sector 4: add VAHW

Group 1

Farmers	VAHW	Field veterinarians	Central level	Laboratory staff
Disease information *Disease recognition* Biosecurity Sanitation Prevention Need to be adapted to the sector	Report about morbidity/mortality and clinical signs *Communication with farmers?*	Collection of samples Report Disease recognition	Data analysis Report Information system?	Diagnosis Upgrade technique *Integration within the network: quality control of the sample process and data dissemination*

Group 2:

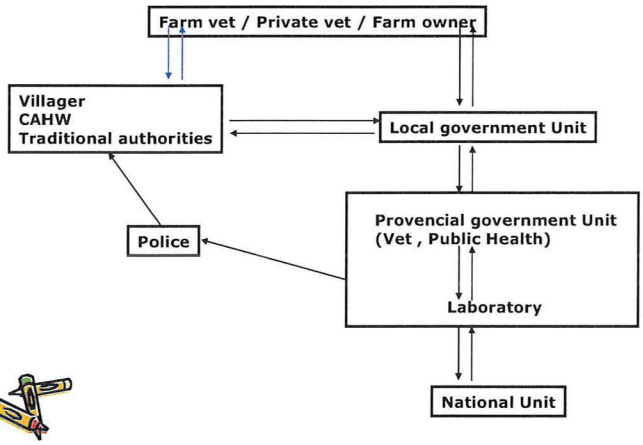
- Case definition:
- System II & III
- 3% mortality rate and 2 fold increasing trend in the next 3 days
- System IV & V
- Unexplained mortality (% ?) in 2 houses
  Timeframe? Less than one week?

- Scanned surveillance
- Targeted surveillance: In high risk area
- -Previous outbreak area
- -Waterfowl birds
- -High density area

Which type of surveillance? Clinical? virological? serological?

Live birds market?

Group 2:



Group 2

Farmers / VAHW	Train to deal with AI
	Personnal Protective Equipment
	In some case how to collect samples
Farm vet / Private vet	Training on biosecurity - measure
	How to collect sample & to transport them
	How to use PPE properly
Local Unit (Technical)	How to implement the stamping out *control*
	What information to collect
	How to implement survey
Provincial Unit	How to process information
Laboratory	Rapid diagnosis
	Standardisation of methods and reporting
National Unit	How to conduct accurate census
	How to organise survey +*data analysis and report preparation*

Group 3

- **What is (are) the case-definition?**[R1]
- Suspected case: respiratory signs[R2] with 3% mortality per day[R3]
- Confirmed: [R4]serological first (ELISA) followed by virological (IFAT, PCR, isolation)

[R1]The same for each system?

[R2]Syndrome surveillance

[R3] Sensitivity?

[R4]Virology (IFAT, isolation, PCR…); Serology

Group 3

	Clinical	Virological	Serological
Scanned (who?, next question)	**Farms, Villages / Broilers** (vets services? Paravets?)	**Market: cloacal swab in market. All species Slaughterhouse** (all the markets and all the abattoirs in the country?)	**Random from village** (villages randomly selected? From all the regions/provinces ? COST?)
Targeted (who? Next question)	**Border area** (villages? markets?)	**Wild birds** (how? where?) **Duck/Waterfowl** (where? Which areas?)	**Quarantine station**

Group 3: Networking

Which actors/stakeholders have to be implied in the surveillance network?
What are the position and role of the farmers within the surveillance system(s)?

Actors/Stakeholders	Role	Remarks
Farmer	Immediately report, helping to collect the samples	Incentives? Interface: vets and/or paravets?
Vet	Education, clinical observation, organise sampling	Private vets: how to involve them?
Paravet	Assist vets in all activities	Salaries?
Lab (Diag)	Virus isolation and serological tests	
Department of vet services	Collect, analysis, report data AI report to other countries Set up emergency responses Set up good animal husbandry practices	
Policy makers	Think of compensation Funding Take action for importing exporting countries	

Group 3: Training

Which actors need to be trained in the field of surveillance?
For each type of actors, which skills need to be strengthened?

Actors/Stakeholders	Skills needed?	Remarks
Farmers	GAHP, Biosecurity , Basic clinical sign	Who are the trainers? Frequency?
Vets	GAHP, Biosecurity , Basic clinical sign Update knowledge & situation on AI Network building for protection and control	
Paravets	GAHP, Biosecurity , Basic clinical sign How to collect the sample	Supervision?
Lab (Diag)	Technique & standard all method for diagnosis	Where? Ref lab? Lab network?
Department of vet services	Update knowledge & situation on AI Analysis Data method Process evaluation	How? Workshop?
Policy makers		

REMARKS :

The case-definition is a complex notion and participants faced difficulties in its determination.

Often, control and surveillance activities were mixed, especially when defining the list of training needs for the stakeholders of the surveillance networks. This is easily explained by the fact that in the countries, the same team is in charge of every aspects of the surveillance and control of the disease.

The notion of targeted surveillance on at risk population or areas, was well understood by the participants.

Annex 6

FAO Workshop, Bangkok, June 2005
MCQ
10-15 min.

Epidemiosurveillance is:

- A field investigation based on a structured survey ☐
- Systematic ongoing collection, collation and analysis of data ☒
- A process of diagnosis at the herd level ☐

	First evaluation	Final evaluation
Success rating (% of correct answers)	44.5%	**85% Best answered**
Improvement rating	+40.5%	

The objective of a surveillance system:

- is to train vets and paravets ☐
- is to control a disease ☐
- is to regularly report outbreaks of a disease ☒

	First evaluation	Final evaluation
Success rating (% of correct answers)	11%	65%
Improvement rating	**+54% Best improvement**	

The purpose of standardisation in epidemiology is:

- To limit the bias related to the sampling method ☐
- To limit the bias related to the questionnaire used ☐
- To limit the bias related to the data selection and collection ☒

	First evaluation	Final evaluation
Success rating (% of correct answers)	78%	75%
Improvement rating	**-3% More confusion**	

Epidemiosurveillance is a component of:

- Risk Analysis ☐
- Analytic epidemiology ☐
- Descriptive epidemiology ☒
- Predictive epidemiology (Modelling) ☐

	First evaluation	Final evaluation
Success rating (% of correct answers)	22.2%	**40% Less understood**
Improvement rating	+17.8%	

In a surveillance system, the denominator data are:

- The information related to the population at risk of disease under surveillance ☒
- The information related to the disease under surveillance ☐
- The data related to the diagnosis test used ☐

	First evaluation	Final evaluation
Success rating (% of correct answers)	66.7%	**80% Best answered**
Improvement rating	+ 13.3%	

What are the main characteristics (2 correct answers) of a study based on *participatory epidemiology* approach:

- The study are of low to medium cost and for a short duration ☒
- The study is representative, based on random sampling ☐
- The structure of the study is flexible and informal ☒
- The study is based on formal questionnaires ☐

	First evaluation	Final evaluation
Success rating (% of correct answers)	41.7%	65%
Improvement rating	+ 23.3%	

A gold-standard is:

- A test with an excellent specificity ☐
- A test with a sensitivity of at least 95% ☐
- The best diagnostic test for a given disease ☒

	First evaluation	Final evaluation
Success rating (% of correct answers)	39%	65%
Improvement rating	26%	

Sensitivity of a diagnostic test is the proportion:

- of truly non-diseased animals ☐
- of truly diseased animals ☒
- of apparently diseased animals

	First evaluation	Final evaluation
Success rating (% of correct answers)	66.7%	**85% Best answered**
Improvement rating	+18.3%	

How can you obtain an accurate sample?

- By increasing the size of the sample ☐
- By doing a convenience sampling ☐
- By doing a random sampling ☒

	First evaluation	Final evaluation
Success rating (% of correct answers)	33.3%	60%
Improvement rating	+26.7%	

The *95% confidence interval* for the mean (2 correct answers):

- Contains the sample mean with 95% certainty ☐
- Is less likely to contain the population mean than the 99% confidence interval ☒
- Give an indication if the sample mean is a precise estimate of the population mean. ☒
- Increases as the size of the sample from a given population increases ☐

	First evaluation	Final evaluation
Success rating (% of correct answers)	33.3%	47.5%
Improvement rating	+14.2%	

When you calculate the following *performance indicator* what are you evaluating (2 correct answers)?

$$\frac{\text{Number of HPAI suspicion investigated in 7days}}{\text{Total number of HPAI suspicion}}$$

- The speed of the field investigation ☒
- The quality of the sampling techniques ☐
- The level of staff training ☐
- The efficiency of communication between farmers and DVS ☒

	First evaluation	Final evaluation
Success rating (% of good answer)	47.2%	55%
Improvement rating	**+7.8% Very little improvement**	

If a case-definition of a suspect case is very sensitive:

- The risk of underestimation of the disease under surveillance increases ☐
- The risk of underestimation of the disease under surveillance decreases ☒
- There is no effect on the detection of the disease under surveillance ☐

	First evaluation	Final evaluation
Success rating (% of correct answers)	33.3%	**40% Less understood**
Improvement rating	**+6.7% Very little improvement**	

Epidemiology is based on that key issue:

- Diseases are studied at individual level ☐
- Diseases are not randomly distributed ☒
- Diseases are randomly distributed ☐

	First evaluation	Final evaluation
Success rating (% of correct answers)	16.7%	**30% Less understood**
Improvement rating	+13.3%	

<u>The general mean was:</u>

At the initial evaluation = 8.2/20

At the final evaluation = 12.2/20

The group of participants progressed of 4 points during the training session

Annex 7

Evaluation of Workshop

Please, cross the answer the most appropriate in your opinion
How do you consider the workshop?

1. Epidemiological Surveillance Network (Day 1)

Content — Satisfaction rating = 88%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

Lecture quality — Satisfaction rating = 86%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

2. Group works on HPAI guidelines and principles (Day 2 & 3)

Content — Satisfaction rating = 81%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

Explanation — Satisfaction rating = 81%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

3. Basic data analysis (Day 4)

Content — Satisfaction rating = 88%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

Lecture quality — Satisfaction rating = 87%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

4. RANEMA

Content — Satisfaction rating = 93%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

Method — Satisfaction rating = 89%

very good (5)	good (4)	average (3)	bad (2)	very bad (1)

The total satisfaction rate is 86.6 % (contents 87.5% and methods 85.7%).

The number of time that the comment has been mentioned by the participants is given in bracket. There is nothing marked when it was mentioned only once.

What did you like most in the training course?

Data analysis (mentioned 7 times)
RANEMA (6 times)
Practical exercises (3 times)
Principles of Participatory Epidemiology (twice)
Trainers (twice)
Everything (twice)
Quality of the presentation
Organisation of the workshop

Is there something you did not like at all?

Nothing (mentioned 15)
Long hours of training day (4 times)

What was the most difficult to understand during this training?

Data analysis (mentioned 7 times)
Communication (language difficulty) between participants & trainers
The surveillance guidelines
To set up a case-definition
To define training needs
Principles of Participatory Epidemiology
Performance Indicators
Applying into practice
Sampling procedure

What are your suggestions for upcoming trainings?

The training should last longer for the participants to understand and remember everything (mentioned 9 times)
The training need more practical (3 times)
More training on data analysis (twice)
More training on sampling design
More training on basic epidemiology
An evaluation should be done after each session
The schedule of the training should be sent in advance

Annex 8

CR-ROM flowchart

The CD-ROM is gathering together the pedagogic objectives, the planning, the lectures and the practical used during the workshop. It contains as well internet links for the FAO and the OIE websites in connection with HPAI, the latest technical documents and guidelines about surveillance of HPAI, articles related to surveillance network, the software used during the practical in data analysis and a temporary version of the tutorial RANEMA.